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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/566,153	02/20/2007	Martin D. Bijker	008895-0325576	1952
909 7590 03/09/2011 PILLSBURY WINTHROP SHAW PITTMAN, LLP P.O. BOX 10500 MCLEAN, VA 22102				
EXAMINER				
TUROCZY, DAVID P				
ART UNIT		PAPER NUMBER		
1715				
NOTIFICATION DATE		DELIVERY MODE		
03/09/2011		ELECTRONIC		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary

Application No.

10/566,153

Applicant(s)

BIJKER ET AL.

Examiner

DAVID TUROCY

Art Unit

1715

Period for Reply -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 January 2011.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1, 2, 4-18 and 20-37 is/are pending in the application.
- 4a) Of the above claim(s) 17, 19-32 and 35-37 is/are withdrawn from consideration.
- 5) ☒ Claim(s) 4 is/are allowed.
- 6) ☒ Claim(s) 1, 2, 5-16, 33 and 34 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-946)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Response to Amendment

1. Applicant's amendments, filed 1/13/2011, have been fully considered and reviewed by the examiner. The examiner notes the amendment to claim 1, 4, 5, 17, 20, and 21 and the cancellation of claims 3 and 19. Claims 1-2, 4-18, 20-37 remain pending in the instant application and claims 17-18, 20-32 and 35-37 are withdrawn due to a restriction requirement.

Response to Arguments

2. Applicant's arguments filed 1/13/2011 have been fully considered but they are not persuasive.

The applicants have argued against the examiners 102(b) rejection, stating that the Yang reference discloses overlapping between edge portions of a plurality of plasma plumes and therefore must necessarily result in substantial influence of adjacent plumes. Initially, the examiner notes that the prior art discloses a small interference and it is the examiners position that is can reasonably be considered reading on the claims as drafted. In other words, the applicant has failed to define the scope of "substantially do not influence" and the metes and bounds of this limitation. In other words, the substantial term is a degree term and it is the examiner's position that Yang discloses two plumes that do not substantially interfere with each other and substantially correspond to the shape of a single plume. See Figure 12A, which discloses a small amount of overlap. Additionally, the examiner notes the present claims are drafted requiring at least two ETP's, i.e. the first and third plasma pumes in a line do not

interfere with each other. Finally, the examiner notes the prior art process discloses overlap of the plurality of plumes to form a uniform coating and the present invention discloses overlapping the deposition profile to form a uniform coating. Yang discloses at Figure 3, a zig-zag arrangement of the plasma plumes. This would result in the a plurality of plumes that do not substantially interfere with each other and will provide the uniform coating as claimed. This arrangement clearly reads on the claims 5-6 as drafted. Taking the disclosure of Figure 12A in combination with the disclosed Figure 3 zip-zag arrangement, it is the examiners position that substantially no interference will exist between the adjacent plasma plumes when arranged on different planes.

The applicant's have failed to address the broad teaching of Yang, which discloses that it is known to adjust the distance between the two plumes and the showing of the zig-zag shaped arrangement, which would result in plasma plumes that do not substantially overlap, but will provide a uniform coating because the coating profile will overlap.

At the very least, Yang discloses adjusting the spacing between the two plumes to provide a uniform coating "is a relatively simple matter to determine by simple experimentation" and therefore clearly the spacing is taught as a result effective variable and one of ordinary skill in the art at the time of the invention would have, through routine and simple experimentation, determined the appropriate spacing to deposit a uniform coating.

The applicant's have failed to address the fact that the present claims require overlap of a Gaussian profile and achieves this overlap through adjusting the distance

between the plasma plumes, the exact same mechanism entailed by the prior art Yang reference. At the very least, the prior art adjusts the plasma plume distance to achieve a uniform coating and moving the plumes to achieve this uniform coating would have been obvious through routine experimentation to achieve a desired uniform coating.

All other arguments are directed at the Yang reference and its failure to adjust the distance between the two sources as discussed above. These are considered unpersuasive for the reasons as set forth above.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1, 5-11, 33, and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yang.

Yang discloses A method for applying a coating on a substrate, comprising: a coating process including arranging, opposite the substrate, at least two expanding thermal plasma (ETP) sources which provide the substrate with a coating, wherein the substrate is located in a process room in which the pressure is lower than the pressure, prevailing in the ETP sources, of a carrier gas which is introduced into the process room via the sources and which forms the expanding plasma, wherein the coating provided by each source has a layer thickness according to a deposition profile, and

choosing different process parameters such that, after the coating process, addition of the deposition profile results in a substantially uniform layer thickness of the coating on a part of the substrate (figures, column 6, lines 22-56). Yang explicitly discloses the arrangement of the ETP sources as claimed (figure 3) and such an arrangement will provide at least two sources where the sources are spaced apart such that the ETP sources do not "substantially" influence each other. The zig-zag feature of Figure 3 reads on the limitations of claim 5-6.

Yang does not explicitly disclose that the plasma share in a single plasma plume is as claimed. However, Yang disclose the zig zag shaped pattern as claimed in claim 6 and also discloses "in order to maximize uniformity, it is preferred to provide a spacing such that there is overlap between edge portions of the plurality of plasma plumes" and discloses "it is relatively simple matter to determine by simple experimentation the optimum spacing for each coating apparatus". Therefore taking the reference in its entirety, it would have been obvious to have provided desired spacing, including a zig-zag spacing as illustrated by Figure 3, as well as provide overlap of the deposited material, but without substantial interference as claimed.

The applicant has failed to define the scope of "substantially do not influence" and the metes and bounds of this limitation. In other words, the substantial term is a degree term and it is the examiner's position that Yang discloses two plumes that do not substantially interfere with each other and substantially correspond to the shape of a single plume. See Figure 12A, which discloses a small amount of overlap. Additionally, the examiner notes the present claims are drafted requiring at least two

ETP's, i.e. the first and third plasma plumes in a line do not interfere with each other. Finally, the examiner notes the prior art process discloses overlap of the plurality of plumes to form a uniform coating and the present invention discloses overlapping the deposition profile to form a uniform coating. Yang discloses at Figure 3, a zig-zag arrangement of the plasma plumes. This would result in the a plurality of plumes that do not substantially interfere with each other and will provide the uniform coating as claimed. This arrangement clearly reads on the claims 5-6 as drafted. Taking the disclosure of Figure 12A in combination with the disclosed Figure 3 zip-zag arrangement, it is the examiners position that substantially no interference will occur between two plasma plumes.

Again at the very least, Yang discloses adjusting the spacing between the two plumes to provide a uniform coating "is a relatively simple matter to determine by simple experimentation" and therefore clearly the spacing is taught as a result effective variable and one of ordinary skill in the art at the time of the invention would have, through routine and simple experimentation, determined the appropriate spacing to deposit a uniform coating.

Claims 5-6: Theses claims are taught by the Yang reference as discussed above.

Claim 7-10 and 34: Yang recognizes these parameters as result effective variables, directly affecting the deposited film profile (column 6). Specifically, Yang discloses the power, flow rates of the gases, and distance between sources directly

effect the deposition profile, i.e. the arc flow and the carrier gas pressure (a portion of the gas can be considered a carrier gas) and therefore it would have been obvious to one skill in the art at the time of the invention was made to determine the optimal value for the plasma parameters and adjust these parameters used in the process, through routine experimentation, to deposit a coating with the desired properties.

Claim 11: The reference fails to disclose the adjusting the outflow angle of the plasma plumes relative to the substrate; however, this is clearly a result effective variable, directly effecting the deposited profile and since Yang is concerned with the deposited profile of each plume, it would have been obvious to have determined the optimal value and adjust the value to obtain a uniform coating, through routine experimentation.

Claim 33: Yang discloses a Gaussian profile (see "bell curve" profile at column 5, lines 40-45)

5. Claims 2, 12-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yang in view of US Patent 6140773 by Anders et al.

Claim 2: Yang discloses all that is taught above and discloses measuring the film thickness (example) and the film thickness and deposition profile of each ETP source can be adjusted by varying process parameters to provide a uniform film (Column 6, lines 22-55). However, Yang fails to disclose feedback control as claimed, however, Anders discloses a plasma array method, disclose thickness control using feed back control, comprising sensors to determine the thickness variation over the

substrate and adjusting the plasma processing parameters to arrive at a uniform thickness. Therefore taking the references collectively, it would have been obvious to one of ordinary skill in the art at the time of the invention to have modified Yang to use the feedback control techniques, i.e. in process thickness measuring and adjusting process parameters to arrive at the desired film uniformity, with a reasonably expectation of predictable and successful results. Additionally, Anders discloses feedback control of the plasma sources is known and suitable in the art to provide a uniform film on a moving substrate (Column 18, lines 22-68) and therefore using such would have led to predictable and successful results.

Claim 12: Anders makes obvious to automatically measure the thickness during the process.

Claims 13-14: Anders discloses optical or electrical sensors, will measure the resistivity as claimed, to measure the film (abstract) and therefore using such would have been obvious to one of ordinary skill in the art at the time of the invention to provide predictable results. Additionally, all the claimed elements were known in the prior art and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination would have yielded predictable results to one of ordinary skill in the art at the time of the invention. See *KSR Int'l Inc. v. Teleflex Inc.*, 127 S Ct. 1727, 1741, 82 USPQ2d.

Claim 15: Yang discloses a profilometer which can reasonably be considered a thickness gauge.

6. Claims 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yang in view of EP 985742 A2, hereafter EP 742.

Yang discloses all that is taught above and while the examiner maintains the position with regards to claim 11 above, the examiner cites here EP 742 which explicitly discloses controlling the plasma outflow angle provides certain benefits and adjusting such is a result effective variable, directly effecting the deposition profile (0028) and therefore it would have been obvious to have determined the optimal value and adjust the value to obtain a uniform coating, through routine experimentation.

7. Claims 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yang in view of Anders and further in view of JP 09-111435, hereafter JP 435.

Yang in view of Anders discloses all that is discloses above and the references disclose measuring the thickness using a sensor, but fails to disclose measuring the temperature of the substrate. However, JP 435 explicitly discloses, during plasma coating, measuring the substrate temperature provides an indication of the coating thickness and therefore one of ordinary skill in the art at the time of the invention would have found it obvious to have modified Yang in view of Anders to measure the temperature as claimed with a reasonable expectation of predictably and successful monitoring the thickness of the plasma coating.

Allowable Subject Matter

8. Claim 4 is allowed.

9. The following is a statement of reasons for the indication of allowable subject matter: None of the prior art cited or reviewed by the examiner reasonably discloses switching on the plasma sources in alternation to provide plasma plumes that do not substantially interfere with each other when coating a stationary substrate.

Conclusion

10. References cited on the PTO-892, but not utilized in the prior art rejections above are considered relevant to at least one of the claimed limitations. US Patent Publication 20030159654 discloses at 0049 thickness measuring. US Patent 5985378 discloses plasma array arrangement. US Patent Publication 20030097988 discloses ETP plasma array.

11. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to DAVID TUROCY whose telephone number is (571)272-2940. The examiner can normally be reached on Monday-Friday, 7-5 a.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks can be reached on (571) 272-1423. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/David Turocy/
Primary Examiner, Art Unit 1715